What is claimed is:

1. A dielectric waveguide type filter using a dielectric waveguide,

the waveguide comprising a pair of main conductive layers holding an upper and a lower surfaces of a dielectric therebetween, and groups of conductive vias arranged in the direction of signal transmission with a space of a distance less than 1/2 of a signal wavelength between the conductive vias and penetrating parts near side walls of a dielectric substrate thus to connect the pair of the main conductive layers with each other,

the dielectric waveguide including a resonator,

the resonator being constituted by dielectric vias formed of a dielectric having a higher dielectric constant than that of a dielectric forming the dielectric waveguide and provided in a region enclosed by the main conductive layers and the groups of conductive vias.

2. A dielectric waveguide type filter as claimed in claim

1, in which a cutoff waveguide path is formed and the resonator is provided in this cutoff waveguide path.

3. A dielectric waveguide type filter as claimed in claim 1, in which an auxiliary conductive layers

are provided for mutually electrically connecting adjacent vias are provided in parallel with the main conductive layers near the side walls of the dielectric waveguide.

4. A dielectric waveguide type filter as claimed in claim 1, in which the resonator has a plurality of dielectric vias.

5. A dielectric waveguide type filter as claimed in claim 4, in which the resonant characteristic of the resonator is controlled by changing positions of the plurality of dielectric vias.

6. A dielectric waveguide type filter as claimed in claim 1, in which the plurality of dielectric vias are arranged on the central axis of the resonator.

7. A dielectric waveguide type filter as claimed in claim 1, in which the plurality of dielectric vias are arranged in symmetrical positions with respect to the central axis of the resonator.

8. A dielectric waveguide type filter as claimed in claim 1, in which a dielectric forming the dielectric waveguide is a low-temperature baked ceramic.

9. A dielectric waveguide type filter as claimed in claim 1, in which the dielectric constant of the dielectric vias is higher than two times the dielectric

constant of the dielectric forming the dielectric waveguide.

10. A dielectric waveguide type filter as claimed in claim 1, in which a plurality of the resonator each having a predetermined characteristic are provided and arranged in series.

11. A dielectric waveguide type branching filter including a common dielectric waveguide and a dielectric waveguide type filter,

the dielectric waveguide type filter comprising a pair of main conductive layers holding an upper and a lower surfaces of a dielectric therebetween, and groups of conductive vias arranged in the direction of signal transmission with a space of a distance less than 1/2 of a signal wavelength between the conductive vias and penetrating parts near side walls of a dielectric substrate thus to connect the pair of the main conductive layers with each other.

12. A dielectric waveguide type branching filter as claimed in claim 11, in which the common dielectric waveguide is a dielectric waveguide comprising a pair of main conductive layers holding an upper and a lower surfaces of a dielectric therebetween, and groups of conductive vias arranged in the direction of signal transmission with a space of a distance less than 1/2

of a signal wavelength between the conductive vias and penetrating parts near side walls of a dielectric substrate thus to connect the pair of the main conductive layers with each other.

13. A dielectric waveguide type branching filter as claimed in claim 11, in which conductive vias for electrically connecting the main conductive layers to each other are provided in a region enclosed by the main conductive layers and the groups of conductive vias.

14. A dielectric waveguide type branching filter as claimed in claim 11, in which dielectric vias having a dielectric constant higher than that of a dielectric forming the dielectric waveguide are provided in a region enclosed by the main conductive layers and the groups of conductive vias.